HF-LPB300

Low Power WiFi Module User Maunal

V 1.0

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

HISTORY

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PRODUCT OVERVIEW

General Description

The HF-LPB300 is a fully self-contained small form-factor, single stream, 802.11b/g/n Wi-Fi module, which provide a wireless interface to any equipment with a Serial/SPI/USB/GPIO interface for data transfer.HF-LPB300 integrate MAC, baseband processor, RF transceiver with power amplifier in hardware and all Wi-Fi protocol and configuration functionality and networking stack, in embedded firmware to make a fully self-contained 802.11b/g/n Wi-Fi solution for a variety of applications.

HF-LPB300 support AP+STA wireless networking and support Wi-Fi Direct mode. HF-LPB300 also provides wireless and remote firmware upgrade, which satisfied all kinds of application requirement. HF-LPB300 support wakup-on-wireless feature which make it a very suitable solution for battery applications with excellent power save scheme.

The HF-LPB300 employs the world's lowest power consumption embedded architecture. It has been optimized for all kinds of client applications in the home automation, smart grid, handheld device, personal medical application and industrial control that have lower data rates, and transmit or receive data on an infrequent basis.

The HF-LPB300 integrates all Wi-Fi functionality into a low-profile, 23.1x32.8x 2.7mm SMT module package that can be easily mounted on main PCB with application specific circuits. Also, module provides built-in antenna, external antenna option.

Device Features

- Single stream Wi-Fi @ 2.4 GHz with support for WEP security mode as well as WPA/WPA2
- Fully self-contained serial-to-wireless functionality.
- Support IEEE802.11b/g/n Wireless Standards
- Ultra-Low-Power for Battery Applications with Excellent Power Save Scheme
- Support UART/SPI/USB/PWM/ADC/GPIO Data Communication Interface
- Support Work As STA/AP/AP+STA/Wi-Fi Direct Mode
- Support Smart Link Function (APP for smart configuration)
- Support Wireless (OTA) and Remote Firmware Upgrade Function
- Support Wakeup-on-Wireless and Wakeup Local
- Support TLS/SSL and mDNS Protocal
- Support PCB/External Antenna Option
- Internal 2MB Flash Inside
- Single +3.3V Power Supply
- Smallest Size: 23.1mm x 32.8mm x2.7mm
- FCC/CE Certificated

Device Paremeters

Table 1 HF-LPB300 Module Technical Specifications

Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE
	Wireless standard	802.11 b/g/n
	Frequency range	2.412GHz-2.484GHz
	Transmit Power	802.11b: +16 +/-2dBm (@11Mbps)
		802.11g: +14 +/-2dBm (@54Mbps)
		802.11n: +13 +/-2dBm (@HT20, MCS7)
	Receiver Sensitivity	802.11b: -93 dBm (@11Mbps ,CCK)
		802.11g: -85 dBm (@54Mbps, OFDM)
		802.11n: -82 dBm (@HT20, MCS7)
	Antenna Option	External:I-PEX Connector
		Internal:On-board PCB antenna
Hardware Parameters	Data Interface	UART
		SPI, PWM, GPIO…
		Others: USB, ADC, RTC…
	Operating Voltage	2.97V~3.63V
	Operating Current	Peak [Continuous TX]: ~240mA Normal [WiFi ON/OFF, DTIM=100ms]: AP Associate: ~21mA; No-AP Associate:~26mA Wakeup-on-Wireless Mode: ~10mA; Deep Sleep: <100uA
	Operating Temp.	**-40℃- 85℃**
	Storage Temp.	-45℃- 125℃
	Dimensions and Size	23.1mm×32.8mm×2.7mm
Software Parameters	Network Type	STA /AP/STA+AP/Wi-Fi Direct
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Update Firmware	Local Wireless (OTA), Remote
	Network Protocol	IPv4,TCP/UDP/FTP/HTTP,FTTPS,TLS,mDNS
	User Configuration	AT+instruction set, Web page/ Android/ iOS Smart Link APP tools

Key Application

- Remote equipment monitoring
- Smart Home/Energy
- Industrial sensors and controls
- Home automation
- Medical/Healthcare devices

Hardware Introduction

Pins Definition

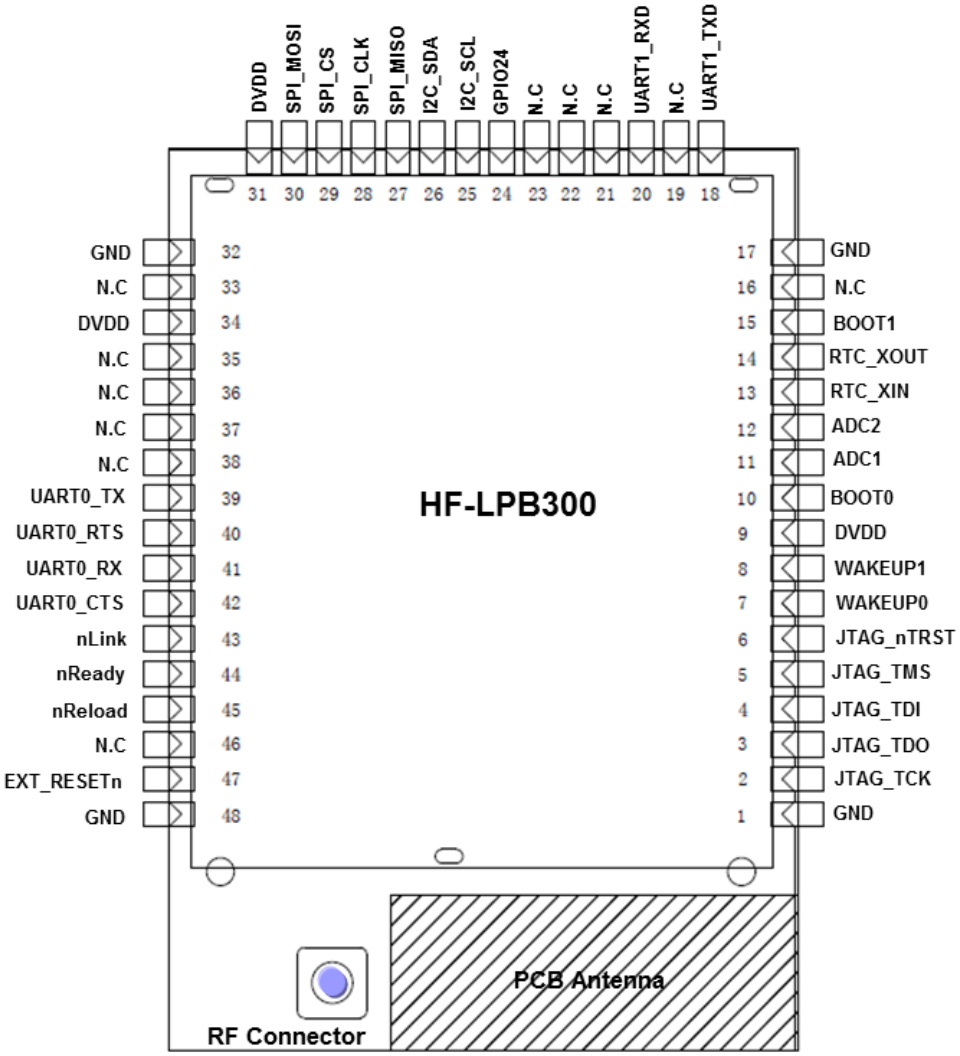

Figure 1. HF-LPB300 Pins Map

Table 2 HF-LPB300 Pins Definition

Pin	Describtion	Net Name	Signal Type	Comments
1,17,32,48	Ground	GND	Power	
2	JTAG Function	JTAG_TCK	I, PU	JTAG/Debug functional pin, No connect if not use. No connect
3	JTAG Function	JTAG_TDO	O	
4	JTAG Function	JTAG_TDI	I,PU	
5	JTAG Function	JTAG_TMS	I,PU	
6	JTAG Function	JTAG_nTRST	I,PU	
7	GPIO	WAKEUP0	I/O	GPIO7, No connect if not use.
8	GPIO	WAKEUP1	I/O	GPIO8, No connect if not use.
9	+3.3V Power	DVDD	Power	

10	GPIO	BOOT0	I/O	GPIO10, No connect if not use.
11	A/D Input 1	ADC1	I/O	GPIO11, No connect if not use.
12	A/D Input 2	ADC2	I/O	GPIO12, No connect if not use.
13	GPIO	RTC_XIN	I/O	GPIO13, No connect if not use.
14	GPIO	RTC_XOUT	I/O	GPIO14, No connect if not use.
15	GPIO	BOOT1	I/O	GPIO15, No connect if not use.
16		N.C		No connect
18	GPIO	UART1_TXD	I/O	GPIO18, No connect if not use.
19		N.C		No connect
20	GPIO	UART1_RXD	I/O	GPIO20, No connect if not use.
21		N.C		No connect
22		N.C		No connect
23		N.C		No connect
24	GPIO	GPIO24	I/O	GPIO24, No connect if not use.
25	I2C Interface	I2C_SCL	I/O	GPIO25, No connect if not use.
26	I2C Interface	I2C_SDA	I/O	GPIO26, No connect if not use.
27	SPI Data In	SPI_MISO	I	GPIO27, No connect if not use.
28	SPI Interface	SPI_CLK	I/O	GPIO28, No connect if not use.
29	SPI Interface	SPI_CS	I/O	GPIO29, No connect if not use.
30	SPI Data Out	SPI_MOSI	O	GPIO30, No connect if not use.
31	+3.3V Power	DVDD	Power	
33		N.C		No connect
34	+3.3 Power	DVDD	Power	
35		N.C		No connect
36		N.C		No connect
37		N.C		No connect
38		N.C		No connect
39	UART0	UART0_TX	O	UART Communication Pin
40	UART0	UART0_RTS	I/O	UART Pin (Or RS485 Control)
41	UART0	UART0_RX	I	UART Communication Pin
42	UART0	UART0_CTS	I/O	UART Communication Pin
43	GPIO	nLink	I/O	GPIO43, No connect if not use.
44	GPIO	nReady	I/O	GPIO44, No connect if not use.
45	GPIO	nReload	I/O,PU	GPIO45, No connect if not use.
46		N.C		No connect
47	Module Reset	EXT_RESETn	I,PU	“Low” effective reset input.

Electrical Characteristics

Absolute Maximum Ratings:

Parameter	Condition	Min.	Typ.	Max.	Unit
Storage temperature range		-45		125	°C
Maximum soldering temperature	IPC/JEDEC J-STD-020			260	°C
Supply voltage		0		3.8	V
Voltage on any I/O pin		0		3.3	V
ESD (Human Body Model HBM)	TAMB=25°C			2	KV

ESD (Charged Device Model, CDM)	TAMB=25°C			500	V

Power Supply & Power Consumption:

Parameter	Condition	Min.	Typ.	Max.	Unit
Operating Supply voltage		2.97	3.3	3.63	V
Supply current, peak	Continuous Tx		200	250	mA
Supply current, IEEE PS	DTIM=100ms		21		mA
Input high voltage		VDD*70%		VDD+0.4	V
Input low voltage		-.04		VDD*30%	V
Input leakage current		VDD On		2	uA
Input capacitance				5	pF
Pullup strength		10		50	uA
Pulldowm strength		10		50	uA
Analog input range		0		3	V
Analog output range		0		3	V

Mechanical Size

HF-LPB300 modules physical size （Unit: mm） as follows:

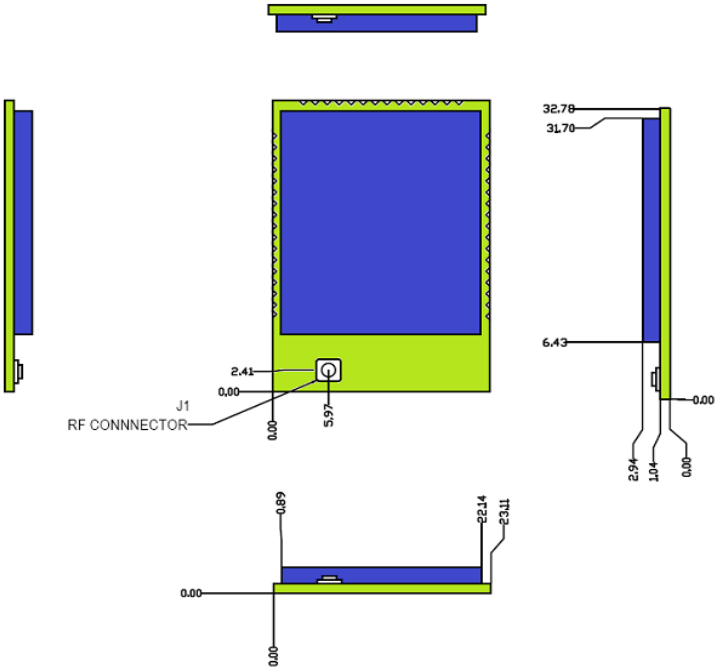

Figure 2. HF-LPB300 Mechanical Dimension

HF-LPB300 Module PCB symbol size (mm) as follows:

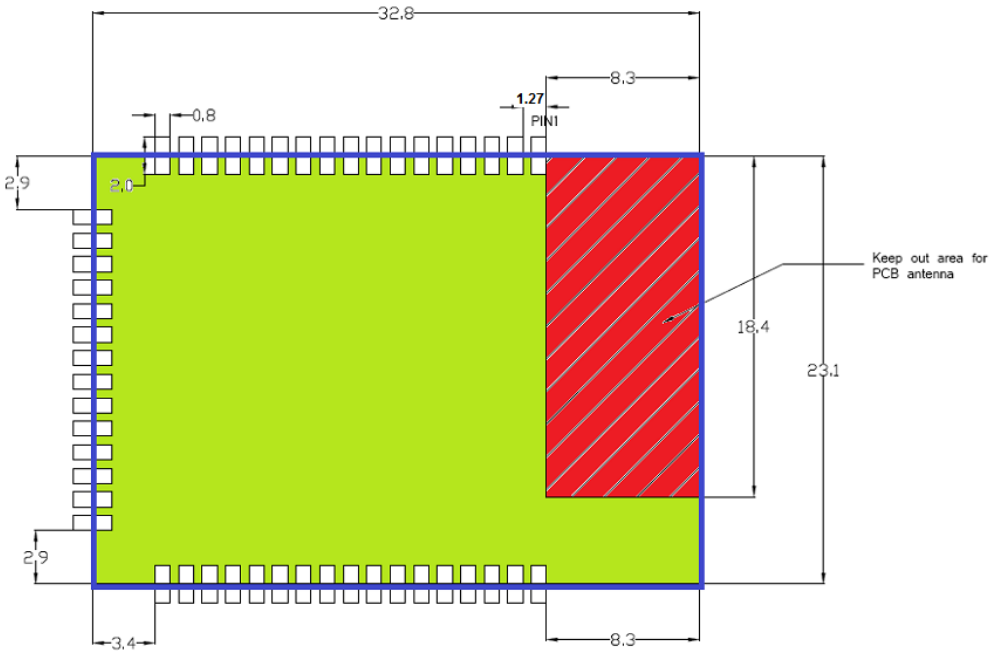

Figure 3. HF-LPB300 PCB Symbol Size

On-board Chip Antenna

HF-LPB300 module support internal on-board chip antenna option. When customer select internal antenna, you shall comply with following antenna design rules and module location suggestions:

- For customer PCB, RED color region (8.3x18.4mm) can't put componet or paste GND net;
- Antenna must away from metal or high components at least 10mm;
- Antenna can't be shieldedby any meal enclosure; All cover, include plastic, shall away from antenna at least 10mm;

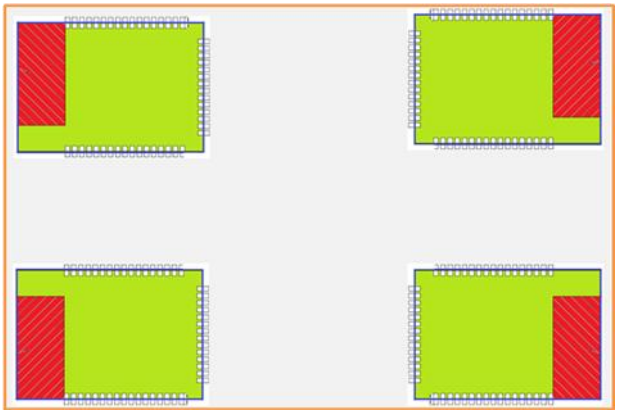

Figure 4. Suggested Module Placement Region

High-Flying suggest HF-LPB300 module better locate in following region at customer board, which to reduce the effect to antenna and wireless signal, and better consult High-Flying technical people when you structure your module placement and PCB layout.

Order Information

Base on customer detailed requirement, HF-LPB300 series modules provide different variants and physical type for detailed application.

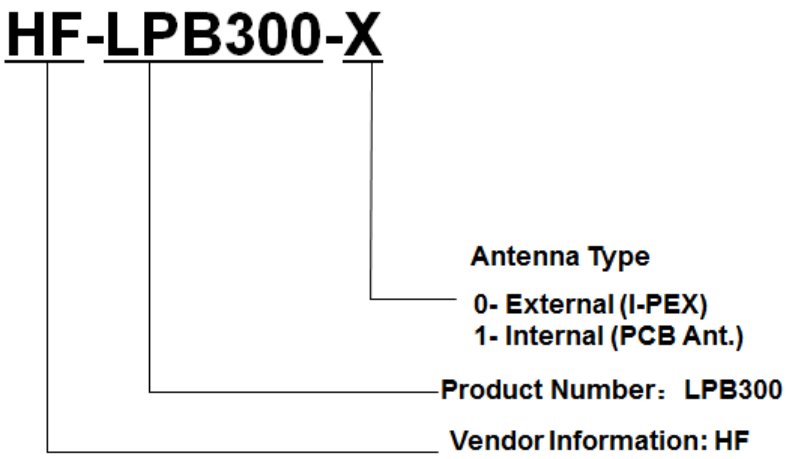

Figure 5. HF-LPB300 Order Information

PACKAGE INFORMATION

Recommended Reflow Profile

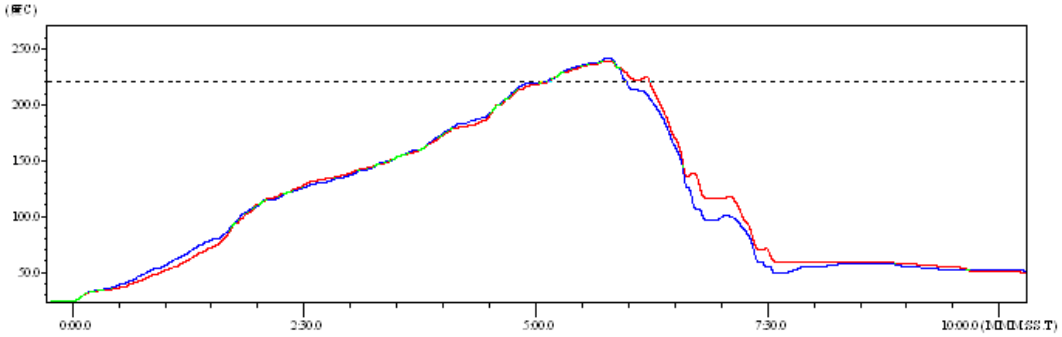

Figure 6. Reflow Soldering Profile

Table 11 Reflow Soldering Parameter

NO.	Item	Temperature (Degree)	Time(Sec)
1	Reflow Time	Time of above 220	35~55 sec
2	Peak-Temp	260 max	

Note: 1. Recommend to supply N2 for reflow oven.
2. N2 atmosphere during reflow (O2<300ppm)

Device Handling Instruction (Module IC SMT Preparation)

1. Shelf life in sealed bag: 12 months, at <30℃ and <60% relative humidity (RH)
2. After bag is opened, devices that will be re-baked required after last baked with window time 168 hours.
3. Recommend to oven bake with N2 supplied
4. Recommend end to reflow oven with N2 supplied
5. Baked required with 24 hours at 125+-5℃ before rework process for two modules, one is new module and two is board with module
6. Recommend to store at ≦10% RH with vacuum packing
7. If SMT process needs twice reflow:

   (1) Top side SMT and reflow (2) Bottom side SMT and reflow

   Case 1: Wifi module mounted on top side. Need to bake when bottom side process over 168 hours window time, no need to bake within 168 hours

   Case 2: Wifi module mounted on bottom side, follow normal bake rule before process

Note: Window time means from last bake end to next reflow start that has 168 hours space.

Shipping Information

TAPE

Size: 340*340*70 mm

BOX

Size: 340*340*350 mm (inside)

Figure 7. Shipping Information

Note:

1 tape = 500pcs

1 box = 5 tapes = 5 * 500 pcs = 2500pcs

APPENDIX A: 88MW300 PIN MAPING

HF-LPB300 VS 88MW300 Pins Map

HF-LPB300		88MW300		HF-LPB300		88MW300	
Pin	Net Name	Pin	Pin Name	Pin	Net Name	Pin	Pin Name
1	GND			25	IIC0_SCL	7	GPIO_5
2	JTAG_TCK	9	GPIO_7	26	IIC0_SDA	6	GPIO_4
3	JTAG_TDO	8	GPIO_6	27	SSP1_RXD	61	GPIO_45
4	JTAG_TDI	11	GPIO_9	28	SSP1_CLK	58	GPIO_42
5	JTAG_TMS	10	GPIO_8	29	SSP1_FRM	59	GPIO_43
6	JTAG_nTRST	12	GPIO_10	30	SSP1_TXD	60	GPIO_44
7	WAKEUP0	36	GPIO_22	31	DVDD		
8	WAKEUP1	37	GPIO_23	32	GND		
9	DVDD			33	N.C		
10	BOOT0	30	GPIO_16	34	DVDD		
11	ADC1	62	GPIO_46	35	N.C		
12	ADC2	63	GPIO_47	36	N.C		
13	RTC_XIN	39	GPIO_25	37	N.C		
14	RTC_XOUT	40	GPIO_26	38	N.C		
15	BOOT1	51	GPIO_27	39	UART0_TX	3	GPIO_2
16	N.C			40	UART0_RTS	2	GPIO_1
17	GND			41	UART0_RX	4	GPIO_3
18	UART1_TXD	64	GPIO_48	42	UART0_CTS	1	GPIO_0
19	N.C			43	nLink	52	GPIO_39
20	UART_RXD	65	GPIO_49	44	nReady	55	GPIO_40
21	N.C			45	nReload	56	GPIO_41
22	N.C			46	N.C		
23	N.C			47	S_RST#	35	RESETN
24	GPIO24	38	GPIO_24	48	GND		